

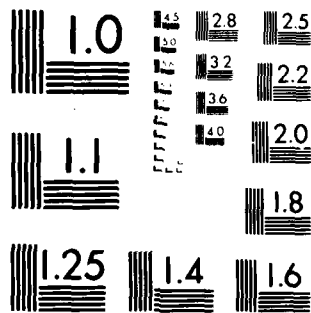
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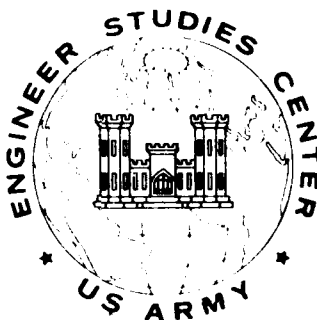
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**US ARMY
PROGRAMMING FOR CONSTRUCTION
IN EUROPE--
FUND SOURCE CONSIDERATIONS,
STATUS, & COST SHARING**

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Prepared by
US Army Engineer Studies Center
Corps of Engineers

APRIL 1980

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Item 20--Abstract--continued

Also provided is a basis for developing negotiating strategies for fund source selection. Part IV looks at cost sharing in alliances and in particular the size of the US contribution in the NATO Infrastructure program.

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US ARMY PROGRAMMING FOR CONSTRUCTION IN EUROPE--
FUND SOURCE CONSIDERATIONS, STATUS, AND COST SHARING

Prepared by
US Army Engineer Studies Center
Corps of Engineers

April 1980

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ABSTRACT

Planning and programming construction projects for the US Army, Europe require the application of factors unique to that theater of operations. This report examines several of these factors. Part II reviews the requirement generation process and the procedures used to determine the funding source. Funding candidates are host nation, NATO Infrastructure, or US Military Construction, Army appropriations. Part III presents a logic matrix which provides an overall view or perspective of Army-initiated construction for Europe showing interrelationships between and among project groupings. Also provided is a basis for developing negotiating strategies for fund source selection. Part IV looks at cost sharing in alliances and in particular the size of the US contribution in the NATO Infrastructure program.

US ARMY PROGRAMMING FOR CONSTRUCTION IN EUROPE--
FUND SOURCE CONSIDERATIONS, STATUS, AND COST SHARING

I. INTRODUCTION

1. Purpose and Scope. Successfully programming construction projects for the US Army, Europe (USAREUR) requires the application of factors unique to that theater of operations. This paper introduces some of these factors, describes how the Army copes with them, displays the results of this process, and provides process summaries in charts or figures. The primary fund sources are: the US Military Construction, Army (MCA) Appropriation; the North Atlantic Treaty Organization (NATO) Common Infrastructure Program (Infrastructure); and host-nation (HN) contributions. With respect to these fund sources, this paper answers the following questions: How is the fund source selected? What are the results of that selection process? Is the US contribution to Infrastructure within reasonable bounds?

2. General. Before endeavoring to develop answers to the questions posed above, a few background statements are necessary.

a. MCA funding. This is the standard funding source for Army construction. AR 415-15^{1/} contains details of programming procedures, definitions, etc. This report assumes a basic knowledge of the major aspects of this funding source.

b. NATO Infrastructure. Allied Command Europe (ACE) Directive Number 85-1^{2/} and US Department of Defense (DOD) Directive 2010.5^{3/} contain

1/ DA, HQ, AR 415-15, Military Construction, Army (MCA) Program Development.

2/ NATO, ACE, SHAPE, ACE Dir No. 85-1, Planning, Processing, and Implementation of the ACE Portion of the NATO Infrastructure Program (U).

3/ DOD, Dir 2010.5, DOD Participation in the NATO Infrastructure Program.

programming guidance, rules, etc., for construction projects in NATO. These references present definitions, concepts, procedures, etc., for the Infrastructure program.

c. HN contributions. Support from HNs in Europe for construction projects is developed through negotiations between the governments involved. HNs have responsibilities and must make contributions within the NATO Infrastructure program. The HN contributions as discussed in this paper refer to both these types of support.

d. Like Gaul, the remainder of this report is composed of three major sections. Each will provide enough of an introduction so that it could probably be packaged as a separate entity.

II. FUND SOURCE CONSIDERATIONS

3. Participation in NATO. The US share of the costs for maintaining NATO is greater than that of any other member nation. It pays about 27 percent of the three principal NATO cost-shared budgets: the Civil Headquarters budget, Military Headquarters budget, and construction of military facilities (Infrastructure) budget. The ability and "willingness to pay" criteria apparently remain dominant factors in setting cost shares for the NATO members. (Analysis of this concept is found in Section IV.)

4. Obligations and Expenditures. The Departments of Defense and State present the US costs to the Congress as part of their annual appropriation and authorization requests. US government agencies obligate the US share; disbursement is made upon receiving requests from NATO. The Infrastructure program normally accounts for more total expenditures than the other two budgets combined, and it has increased substantially since the cessation of the Vietnam conflict (primarily as a result of Warsaw Pact increases). Programming construction projects for the European theater requires the coordination of many people and organizations. The next paragraphs describe how the US Army prepares and translates programming data into obligation requests for Congress.

5. Requirements Determination. Determining valid construction requirements is fundamental to the planning and programming process. This determination is always accomplished in coordination with the theater and ground unit commanders involved and is nominally in support of NATO-approved defense plans. All proposed projects must be evaluated in light of the total defense program and system capabilities in order to establish their validity and degree of priority. This is regardless of whether requirements come from the

"field" or are imposed by technological developments or financial considerations originating in the US. The concepts of validity and priority are continuous in the sense that a valid project may change priorities many times in a nonstatic environment. Establishing a requirement's initial validity is not within the scope of this report except in the sense that project priorities must be coordinated and balanced among and between fund sources after selecting the primary fund source.

6. System Perspective. To place the emphasis of this section (construction fund source selection) in perspective, it will be helpful to review selected aspects of the deployment of a new weapons system. As generalized in Figure 1, the perceived threat is evaluated in terms of current doctrine and capabilities by DOD, Department of the Army (DA), European Command (EUCOM), Supreme Allied Commander Europe (SACEUR), NATO, and subordinate commands. This evaluation results in an initiative which is translated into an appropriate Mission Element Need Statement (MENS). In the case of a proposed new system for deployment in Europe, the process branches in order to allow SYSTEM DEVELOPMENT in accordance with the Life Cycle System Management Model (LCSMM) in the US and for corresponding FACILITY DEVELOPMENT in the European theater. Obviously, detailed facility requirements are dependent on system development, but gross facility planning must occur concurrently (with an open cross-flow of information) to ensure synchronized completion of both. The critical problem of how to fund new facility requirements must be answered in the case where existing facilities cannot accommodate the developing system. The myriad of national, economic, political, and military factors involved in multinational construction make the decision difficult, but the decision must be made as early as practicable because of the time required in programming

EXAMPLE IN DEVELOPMENT/DEPLOYMENT OF A SYSTEM

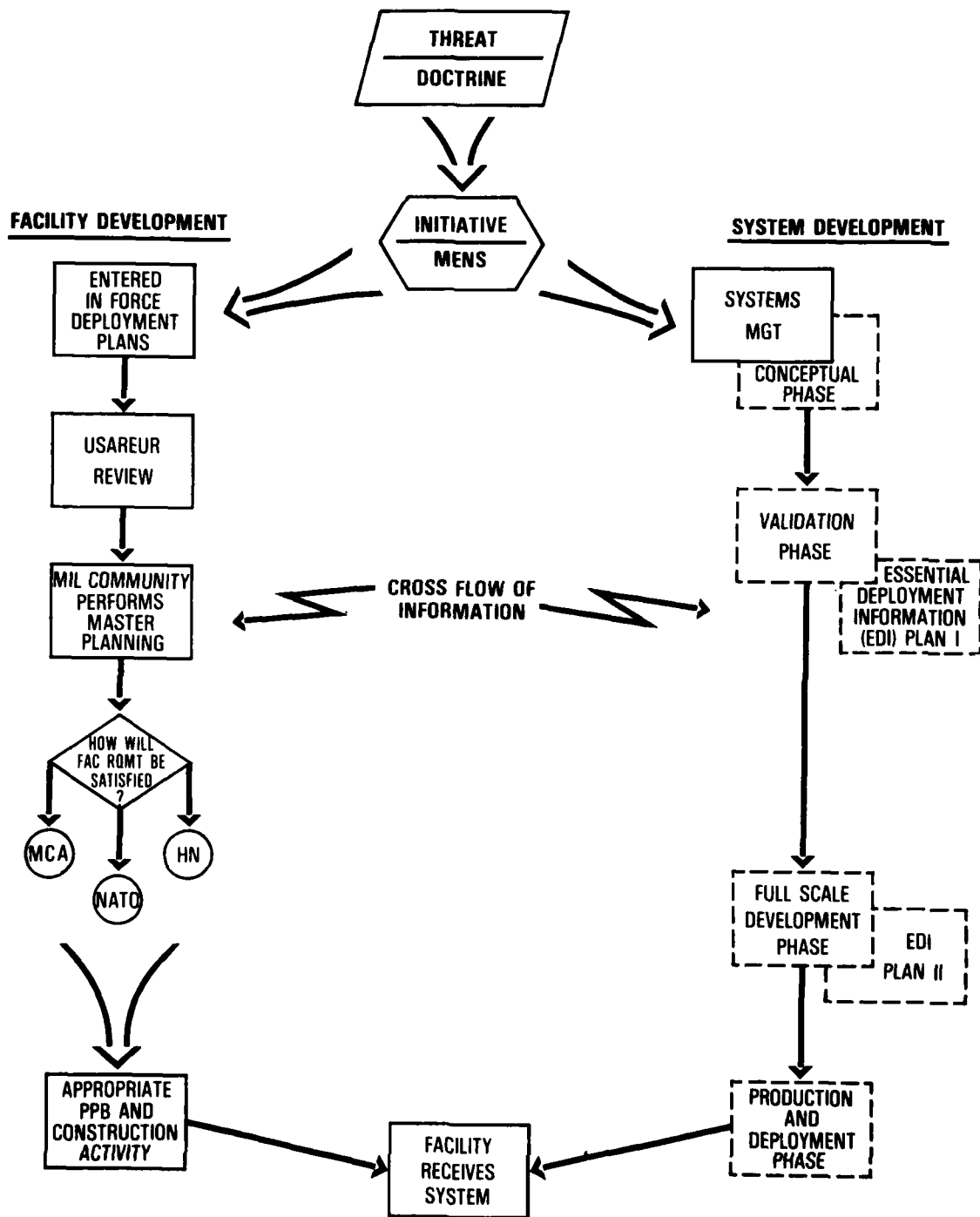


Figure 1

and budgeting systems (and for actual construction). In addition, it must be the result of a logical, honest process easily defended on examination.

7. Fund Sources. As noted in Figure 1, the three currently viable fund sources are: (1) HN--individually negotiated HN agreements, (2) NATO--NATO Common Infrastructure, and (3) MCA--US funding via MCA. From a nationalistic viewpoint, HN is the preferred fund source (the HN can be expected to fund 50 percent or more of joint projects) with NATO Infrastructure as the next best alternative (US pays its "share" of both US and non-US projects). US unilateral funding (i.e., MCA) should be pursued only after the other two sources have been rendered infeasible--whether economically, politically, or chronologically.

8. Congressional Concern. Congress has expressed concern over the huge backlog of construction requirements for US forces in Europe. Further, it has informed DOD (and the Army) that it should not expect greatly increased authorization from Congress to address this backlog. Congress realizes that some construction in Europe is a US responsibility. But, all future construction (in support of troop increases and specified other programs) should be addressed through separate HN agreements, possibly along the lines of the OFFSET programs^{4/} or NATO Infrastructure before falling back on US MCA financing. All prefinancing^{5/} must be demonstrated as being economically

4/ OFFSET programs were a series of negotiated agreements between the US and the Federal Republic of Germany (FRG) whereby the FRG agreed to certain financial arrangements to "offset" US balance of payments deficits. See Trevorton, The "Dollar Drain" and American Forces in Germany.

5/ Prefinancing--an accepted NATO Infrastructure procedure whereby a nation finances a construction project which is not included in an approved Infrastructure program (slice). The nation intends to later recoup (recover) the national funds when NATO formally includes that project in an approved slice.

advantageous to the US with respect to the critical path of US master restationing or deployment plans or be of overwhelming military necessity.

9. Timing Considerations. When a project is proposed for which no NATO precedent for eligibility exists, the US should press for project eligibility unless it can be demonstrated to be economically disadvantageous. In the absence of existing NATO criteria, as a minimum, Supreme Headquarters Allied Powers Europe (SHAPE) recommended criteria must normally be established before the NATO programming process can begin. (There have been some major exceptions to this policy in the last few years.) Experience has shown that acceptance of valid draft criteria and inclusion of a project in a program "slice"^{6/} by NATO will take from 3 to 5 years based on the unanimous agreement by all member nations. It goes without saying that each nation wishes to protect its share of the NATO funding and must see in any new criteria some national return or total Alliance benefits. US projects which do not demonstrate such a return to other nations may not survive this political process. However, if a project based on SHAPE-recommended criteria gains unanimous member nation approval, it can be included in a NATO slice. SHAPE has recently completed an investigation and recommended improvements which will streamline Infrastructure programming procedures by as much as 9 months. The capability to shorten requirements determination and programming may eventually result from both of these measures (to be time-phase integrated and fully implemented by 1983), and similar US initiatives to compress and improve MCA programming as well as to improve the Infrastructure/MCA process interface.

^{6/} Slice--a single NATO Infrastructure budget/program year. Slice 1 was 1950.

Slice group--NATO sets fund ceilings for multiyear periods. The last several groups have covered 5-year intervals.

10. Project Essential Elements of Information (EEI). After recognizing a requirement, it is logical to select the most economically advantageous fund source that has a reasonable chance of meeting requirement deadlines. There must be a reasonable expectation that the fund source pursued can accommodate the construction requirement in the required time frame. The theater and ground unit commanders involved, and the political and military personnel conducting negotiations must work together to elicit certain information from available data before they make comparative decisions. Minimum EEI and computations required in different project-related areas are:

a. Project related.

- (1) Expected construction duration (after award of contract).
- (2) Expected duration if project is crashed (i.e., additional manpower and material are infused to reduce construction time).
- (3) Expected total cost for normal construction.
- (4) Expected cost if project is crashed.

b. HN related.

- (1) Expected time required in negotiations before the go/no go decision point is reached if there is a precedent for support, such as a Status Of Forces Agreement (SOFA), an OFFSET agreement, etc.
- (2) Expected time without such a precedent.
- (3) Expected time before HN construction capability could begin work (includes construction capacity and economic situation).
- (4) Additional time required in HN planning, programming, budgeting system (PPBS) for fund agreement ratification.
- (5) Unique HN considerations--appropriateness of our needs with HN attitudes; e.g., HN prefers funding barracks rehabilitation to nuclear warhead storage (ammunition storage is less attractive to HN).

c. US construction-system related.

(1) Delay cost data if project is on critical path of other operations or systems deployment.

(2) Expected time required in US PPBS if unilateral or conjunctive^{7/} funding is required.

(3) Expected time without such a precedent.

d. Infrastructure related.

(1) Expected time required in Infrastructure system for Defense Planning Committee (DPC) final approval of project slice if project has eligibility precedent.

(2) Expected time required without eligibility precedent.

(3) Expected time required for type "B" estimate, Payments and Progress (P&P) Committee approval, and for HN construction capability to be ready to begin work.

11. Selection Process. When this information has been accumulated (or estimated) and evaluated, it is possible to select the most advantageous fund source (see Figure 2 for the summary decision process). This process requires evaluating each project as an individual entity and results in either the selection of one of the three viable fund sources or a complete reevaluation of the requirement. As noted in the figure, there can be many qualifications attached to the selection of a fund source. Figure 3 shows the logic behind such qualifications and the projected decision process required to arrive at them. For example, if a proposed new project is similar to work which was

^{7/} Conjunctive funding--a special funding arrangement by which a host or user nation finances the costs of those portions of projects which are essentially national requirements in excess of NATO wartime standards and thus not eligible for shared or common funding in Infrastructure.

SUMMARY FUND SOURCE DECISION PROCESS

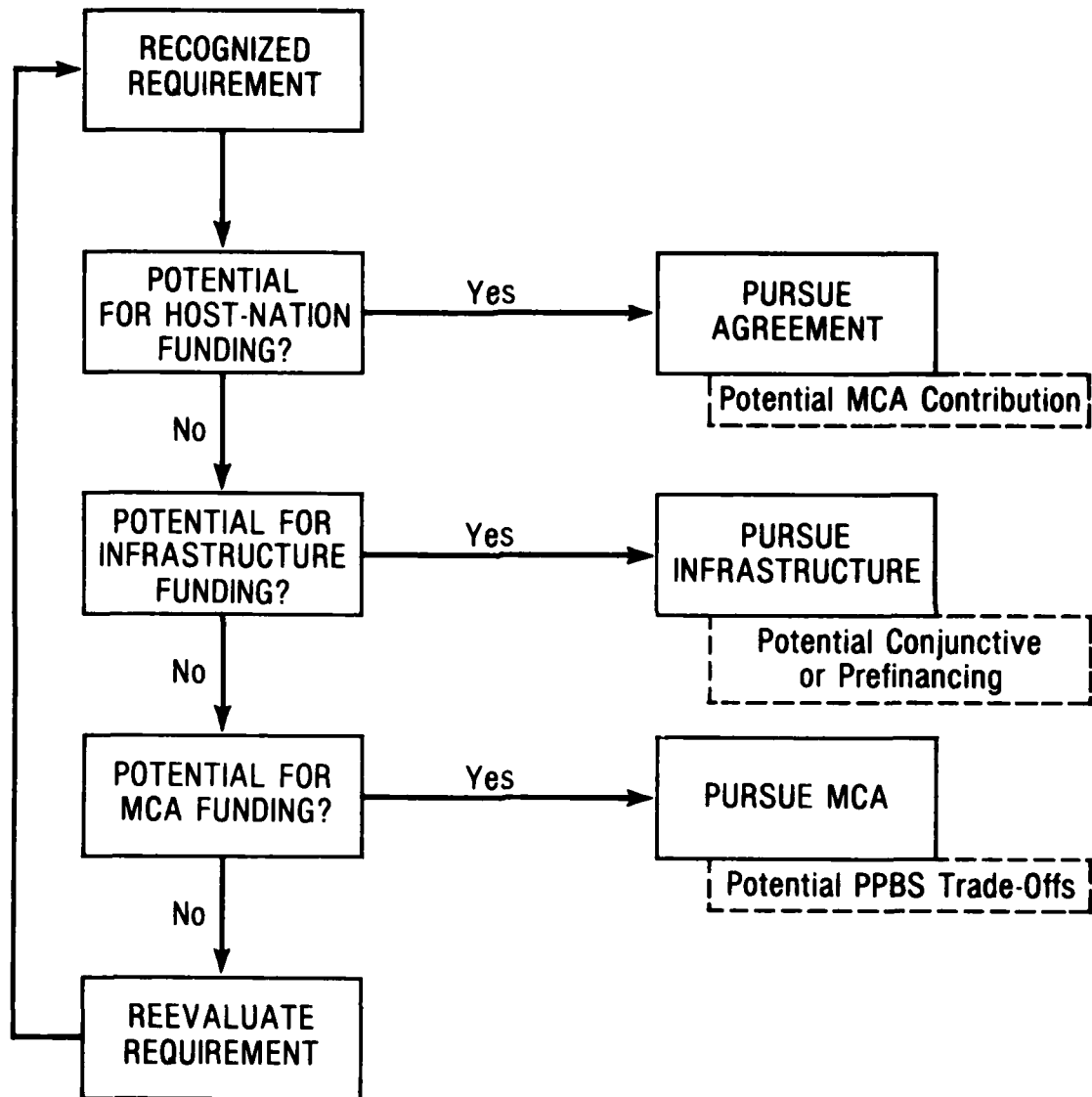


Figure 2

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FUND SOURCE DECISION PROCESS

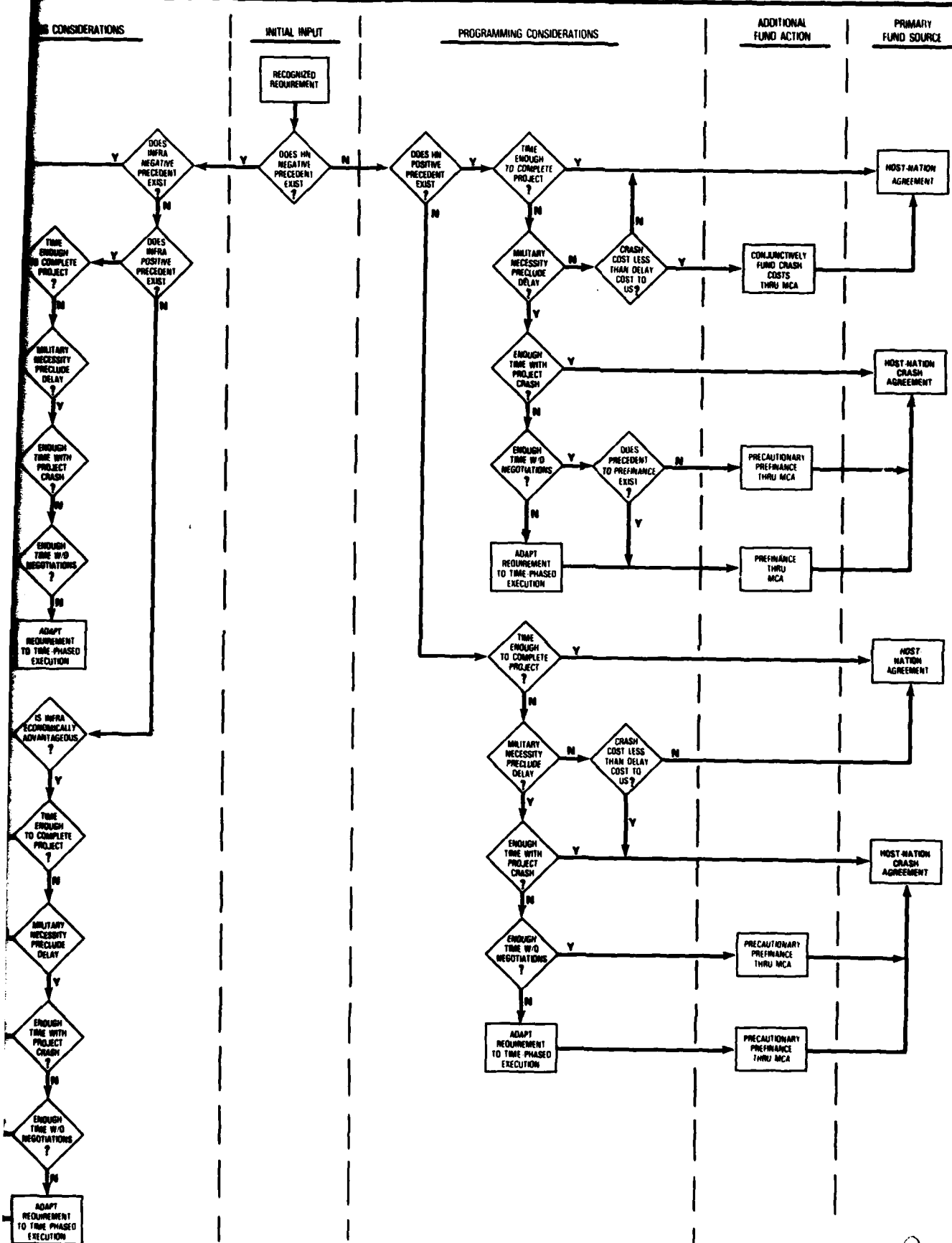


FIGURE 3

2

vehemently rejected by the HN in prior negotiations, then a negative precedent would be said to exist and HN funding is precluded. In this case, the decision process chart would next direct the same precedent interrogative with respect to Infrastructure. If a similar negative precedent existed, the process chart would result in MCA being selected as the primary fund source. But, if there were no negative Infrastructure precedent, the next interrogative would establish whether or not a positive Infrastructure precedent existed. If no positive precedent existed (and thus no precedent at all), the decision chart would require consideration of whether it was appropriate to pursue Infrastructure funding or whether it would not be cheaper in the long run to fund construction via MCA. If Infrastructure funding is not economically advantageous, the decision process chart would result in MCA being selected as the primary (and in this case, only) fund source. These are the only two sequences of events that allow MCA to be selected as the primary fund source for a project. All other paths in the decision process chart result in selecting Infrastructure or an HN agreement as the primary fund source. In considering the other fund sources, the possibility arises that there may not be enough time to construct the project using normal construction practices and thus it is necessary to reduce (crash) construction time by infusing additional men and material (at additional cost) to the process. If the crash cost is less than the cost of the delay, the US may find it advantageous to supplement the primary fund source by conjunctively funding the crash costs through MCA accounts. Such a situation could arise, for example, if the US had a weapons system programmed for deployment well in advance of the estimated completion date of a project funded by a non-US source, which, for political reasons, was not subject to renegotiation. It would be in the best

overall interest of the US to fund the crash costs if the cost of storing the weapon system exceeds the cost of crashing the project. Similarly, if time permits, it may be possible to negotiate a crashed project initially. Under certain conditions of military necessity and limited time, it may be mandatory for the US to initiate a project with MCA funds and be subsequently reimbursed by the primary fund source. This is normally termed prefinancing and is predicated by a positive precedent. In addition, under rare circumstances it is sometimes necessary to prefinance a militarily urgent project when there is no guarantee of complete reimbursement. Rather, there is a reasonable expectation that a remunerative arrangement may be reached sometime in the future, but the urgency of the project requires immediate construction. This is normally termed precautionary prefinancing and encompasses the possibility of MCA becoming the primary fund source if subsequent negotiations fail. Using this process, it is possible to accumulate a large number of potentially unrelated projects which could qualify for one of the three fund sources on an individual basis. As this number grows, however, the entire package has a progressively diminishing probability of surviving fund cuts. In addition, there are usually unforeseen add-on requirements (externally imposed, etc.) which must be accommodated.

12. Prioritization and Fund Balancing. After selecting the most logical fund source alternative for a project, it must be evaluated in terms of priority, with respect to other projects competing for the same fund source and in terms of current and anticipated political requirements vis-a-vis fund source. This results in prioritized project lists for each of the three fund sources.

Prioritized List of
Projects Proposed for
HN Funding

1. _____
2. _____
3. _____
.
.
.
n _____

Prioritized List of
Projects Proposed for
Infrastructure Funding

1. _____
2. _____
3. _____
.
.
.
n _____

Prioritized List of
Projects Proposed for
MCA Funding

1. _____
2. _____
3. _____
.
.
.
n _____

The lists are prioritized with respect to critical paths of major programs so that a project in one fund source does not delay a project in another fund source. Independent projects are inserted in accordance with externally imposed requirements or military necessity. All prioritizations consider the time constraints imposed by the differing bureaucracies and PPBS requirements.

13. Contingency Planning. The possibility of a project falling outside of the selected fund source constraints (or beyond political equity constraints) may require modifications to major programs or alternate source funding. Failures by a selected fund source to accommodate US-initiated construction would necessitate a reevaluation of priorities in all three lists because of their interdependence. The delay or loss of funding for a project on the critical path of a major program may have such extensively compounded costs that US prefinancing or unilateral funding may be the cheapest long-term alternative.

14. Dual Programming. "Dual programming" merely represents the US capability to supplement or supplant one of the other fund sources. It is unrealistic to expect NATO member nations to allocate funds for a project which is known to be viable for separate HN funding or vice versa. Any precautionary dual programming of US projects which have not failed HN or

Infrastructure funding, but are "likely" to fail, must be considered on a case-by-case basis and justified economically.

15. Fund Source Summary. USAREUR and DA follow the procedures described in this section to translate initiative requirements (from new weapons systems, troop deployments, etc.) into valid construction requirements. Once the construction project is identified, the "proper" fund source within the European environment is selected. Fiscal year budgets and 5-year defense plans for construction in Europe are assembled based on the results of the processes described above.

III. MATRIX DISPLAY

16. Perspective. The preceding section presented an explanation of the process used by USAREUR and DA to select and balance funding sources for construction projects in Europe. This section displays in a matrix format the projected results of that process by major project groupings for the period FY 1981 to FY 1985. US construction programming for Europe is like a constantly moving train. It is possible to catch snapshots at given points in time, but 2 or 3 weeks later some events will transpire that require a shifting and reprioritization of earlier efforts. This section has been written based on a snapshot view and an analysis at a given point in time. The product (matrix) was also produced by looking at the forest rather than counting and identifying the individual species of trees therein. Figure 4 introduces some thoughts, factors, and ideas pertinent to US participation in the NATO Alliance. These ideas help to clarify and provide a backdrop for the more specific points to be discussed in the matrix.

17. NATO Infrastructure.

a. Figure 5 provides a summary display of arguments frequently presented as to why a nation would or would not consider a jointly financed construction project as being appropriate to meet its defense needs. The US is no exception and is frequently faced with making choices as to the appropriateness of Infrastructure funding. Figure 5 is presented to save space and to keep from repeating the same ideas or factors for the NATO Infrastructure column in the Logic Matrix. The US currently pays 27.42 percent of each project that is constructed by Infrastructure.

FACTORS/IDEAS PERTINENT TO US PARTICIPATION IN NATO

1. US troops are in Europe to protect US interests (economic, political, military, etc.).
 2. US troops and dependents stationed in Europe are a guarantee of the US commitment to fight or become involved in a European (NATO) conflict. The US has precluded itself from not fighting because of the hostage value of US personnel.
 3. Given that we place our people there, we must provide them with decent facilities. We do this through a combination of Alliance-sponsored construction projects (Infrastructure), HN contributions, and US military construction funding. (Section II described how funding choices are determined.)
 4. The US has obligations because it is a member of the NATO Alliance and special obligations because it is the largest member (see Section IV).
 5. Reduction in warning time has increased the importance of early combat power. Facilities supporting new weapons systems, additional storage in theater, and other initiatives are very important.
 6. Current world events have probably changed the views of Congress on cost-sharing arrangements for US participation in foreign alliances. Insistence on our interpretation of a fair share (or greater return in each NATO slice) may be counterproductive, but Congress wants NATO nations to do more so that the US can do more in other parts of the world (i.e., Middle East).
 7. National "self-interest" programs are restrictive and break down existing procedures. An example is "Buy American" clauses which may be too restrictive for fostering cooperation and cost sharing within the Alliance.
 8. Matching national, HN, and Alliance programs with respect to timing, funding, etc., is difficult and time consuming.
 9. Limitations on construction funding have ripple-type effects through the system. Construction cannot be managed independently of other on-going programs. Must look at construction costs as a percentage of system costs.
 10. The military has needs for basic facilities regardless of where the forces are stationed.
-

Figure 4

NATO INFRASTRUCTURE

NATO INFRASTRUCTURE	
Considerations For	Considerations Against
<p>Fosters: Cooperation Coordination Communication Standardization</p> <p>A large Alliance-sponsored construction program can strengthen Alliance (a showpiece of cooperation/resolve).</p> <p>Obtaining scarce land for NATO projects is easier for an HN to justify than acquiring land for a single user nation, especially for nuclear or controversial weapons.</p> <p>From NATO viewpoint--can promote equal defense across entire Alliance frontage to balance Warsaw Pact threat.</p> <p>A way to normalize/standardize contributions among member nations (e.g., US does not provide land, the Infrastructure contribution substitutes).</p> <p>Avoids duplication of separate facilities, strengthens overall defense with construction savings (i.e., buy more defense capability with same total contribution).</p> <p>Minimum essential standards, no frills, ensures consistent international construction.</p>	<p>Time-consuming process.</p> <p>More administrative procedures (international competitive bidding).</p> <p>More coordination required.</p> <p>Total cost of individual projects may be more because of administrative arrangements.</p> <p>Loss of control.</p> <p>Loss of flexibility.</p> <p>Individual slices may not be representative of national contributions and priorities.</p> <p>Facilities tend to be built where political decisions dictate rather than on pure military necessity.</p> <p>May be hard to identify or justify national benefits.</p> <p>Wartime (austere) standards rather than peacetime deployment usage considerations/factors creates inequitable hardship on US soldiers deployed in Europe.</p>

Figure 5

b. All NATO nations are eligible to have military projects jointly financed through Infrastructure. There is no financial or numerical limit to the number of projects that a nation can submit. Military necessity is the primary reason for inclusion of projects. However, there is a certain degree of political give and take in the final development of the approved yearly construction program. Infrastructure will spend all of its available funds. Most nations submit large volumes of projects to increase the likelihood that they will receive some direct return for their financial contribution to the program.

18. HN Support. The HN is required to provide land cost free to NATO for projects in the Infrastructure program. Access roads to the project and utility connections must also be contributed by the HN. Because the Infrastructure project is in its territory, the HN is responsible for preparing all plans, specifications, cost estimates, etc. and receives a fee calculated as a percentage of the project cost. The HN must coordinate all administrative procedures relating to an Infrastructure project in its territory. These items are common to all Infrastructure projects and do not appear in the Logic Matrix. In addition to Infrastructure responsibilities, the HN is being asked to provide support for US forces. Defense and Army are currently studying ways in which the HN can provide more support for US forces. Some areas under study are transportation, air base security, prisoner of war handling, medical evacuation, and civilian labor augmentations. These types of support, if provided, reduce the probability of the HN providing direct funds for construction projects.

19. The Logic Matrix Display. Figure 6 is the Logic Matrix for US Army construction projects in Europe.^{8/} The contents of this figure represent in a single display the results of Army funding decisions. The figure has six columns: Title, Descriptive Comments, NATO Infrastructure, HN, US, and Comments. The primary fund sources are NATO Infrastructure, HN, and US. The rows of the matrix represent major groupings of construction projects. These groupings were designed to capture the essence of all Army construction in Europe. Included in each project grouping is a cost table designed to show projected costs (where appropriate) for the period FY 81-85 for both the total program and the associated construction. Cost figures shown in () in the three fund source columns represent the construction costs expected to be funded by the indicated sources.

a. To illustrate the matrix contents, the PATRIOT (Row 6) will be used as an example:

Matrix Entry: Major Project Groupings (Columns 1 and 2):

Column 1 (Title): PATRIOT

Estimated Costs FY 81-85

Program	Construction
\$ _____ Bil	\$ _____ Mil

This column represents the name of the major project grouping, PATRIOT, and contains the cost table showing total program costs (\$ _____ Bil) and the

^{8/} Cost data not included in this UNCLASSIFIED version. A special classified annex (Annex C, under separate cover) contains the Logic Matrix with all available cost data. Where cost data are shown, Mil is million dollars and Bil is billion dollars.

associated construction costs (\$ Mil). Construction costs represent approximately 13.5 percent of total program costs.

Column 2 (Descriptive Comments):

"Air defense system geared to gaining air supremacy." The items to be constructed are "Secure operational facilities with barracks."

A further descriptive comment "Key initial defensive factor tied to Rapid Reinforcement." This provides some additional information potentially useful in prioritizing individual projects in the programming process.

The source of the data was "(PCD from FY 81-85 POM, Section IX-C)."

Matrix Entry: Fund Source Rationale (Columns 3, 4, and 5):

Column 3 (NATO Infrastructure):

In this column the comments

"Improves collective NATO defense by replacing obsolescing equipment (NIKE-HERC).

Positive eligibility precedent.

Criteria being specified."

represent known factors and reasons as to why Infrastructure is a viable fund source. The "(\$ Mil)" represents the amount between FY 81-85 that the US is programming through the NATO Infrastructure program.

Column 4 (HN):

The HN column entry

"Fund some facilities due to danger of threat. However, likelihood of HN funding in timely manner is remote." gives reasons why the HN may be willing to help fund construction facilities. The lack of any programmed funds indicates that this was and is a very unlikely source for construction funding.

Column 5 (US):

The US entry

"US pays for national deployment considerations.

(\$ Mil)"

represents what the MCA program must absorb even though the primary source of construction funds was seen to be Infrastructure.

1

1

POLLUTION ABATEMENT	Mandated factors for environmental considerations. Standards vary by nation. Primary concerns are air and water. Not a military defensive capability factor.	Not applicable--not a wartime consideration.	HM will not support pollution controls because HN is concerned about their environment.	sees pollution controls useful US is adequate.	Standard of control is an issue.
RELOCATIONS AND REALIGNMENTS	Facilities for these initiatives.	Common funding for NATO-initiated moves in support of total Alliance defense plans.	HM funding for HM-initiated moves or for moves yielding HN benefit.	(\$3.1 MII)	Continental United States (CONUS) program is \$702.5 MII. (PCD from FY 81-85 POM, Section VI-J)
POW & STRUCTURE INCREASES (and military)	Operational and administrative facilities for troop increases. Approximate US standards. (PCD from FY 81-85 POM, Section IX-C)	If willing to improve Alliance combat power, NATO will collectively fund combat improvements for additions to existing NATO forces. National vs NATO factors.	May be willing to fund some administrative facilities for increased deterrent provided by new forces. Small likelihood of HN funding.	(\$ MII)	Northern Army Group (NORTHAG) is theater reserve and should be NATO funded. All relocations in accordance with Master Relocating Plan (MRP).
Estimated FY 81-85 Costs Program \$ MII Construction \$ MII	FACILITY MODERNIZATION	Living and working conditions to approximate US standards for peacekeeping deployments. (Facility investment data from FY 81-85 POM, Section XI-B)	US pays equivalent costs for similar facilities in US. All additional costs should be HN or jointly financed. Economic benefit of having troops participate in local economy. PRC "OFFSET" programs funded in previous years.	(\$ MII)	Quality of life--Welfare of troops is important. They are the ones who must fight. All projects in line with MRP considerations.
FAMILY HOUSING	Facilities for dependents of troops in Europe (both for national and NATO forces). Lease or build to lease program for 18,680 units by FY 85.	Not applicable--housing for dependents is a user responsibility. Not a wartime consideration.	May be willing to share costs with US or to provide facilities and lease them at reasonable rates.	(\$316.7 MII)	Estimated example--PRC shows increased interest rates to contractors. Integration of US into local community.
OPERATIONS AND MAINTENANCE (O&M)	Utility costs, repairs, etc.	Not applicable--has always been a user responsibility.	US pays equivalent utility costs for facilities in US. All additional costs should be HN or jointly financed.	(\$450.0 MII)	User responsibility. Requires negotiation for change. More palatable to HN than "OFFSET" payments.
ENVIRONMENTAL INVESTMENT PROGRAM	Special MCA program, circa FY 76--can impact on Pollution Abatement and O&M.	Not applicable--seen as user responsibility.	HM might support initiatives to conserve scarce energy resources.	US should fund in order to get leverage in O&M utility costs negotiations. (DOO constraint--only 10% of program funds may be spent overseas.) (\$45.6 MII)	Mandated program by Congress. CONUS program is \$568.9 MII. (PCD from FY 81-85 POM, Section VI-J)
TRAINING	Land and facilities for training. Improves readiness. (PCD from FY 81-85 POM, Sections II-D and IX-C)	Positive eligibility precedent but no definite criteria--will support multinational but not single-nation projects. Case by case analysis required; not many training installations are covered.	Joint fund possibilities on shared training. Opportunity to establish training link with actively assisting partner and countries. Real estate considerations.	MCA fund to: 1. Maintain control of training time. 2. Not economical to pursue NATO funding. 3. Cheaper O&M if US owns. 4. Maximum flexibility. (\$ MII)	User/owner can control when and for how long training would last. Allows trade-off on "out" range for time on P&G ranges. Congress thinks HN or NATO should fund.
Estimated FY 81-85 Costs Program \$ MII Construction \$ MII					

Figure 6

Matrix Entry: Comments (Column 6):

The Comments entry

"Funding in accordance with past practices." indicates that this particular project grouping, even though it is a new weapon system, will follow standard Infrastructure funding procedures when eligibility criteria are finalized. PATRIOT will also use some MCA procedures.

b. The matrix contains:

(1) Cost estimates for the period FY 81-85: program cost, construction cost, and construction costs programmed by each major fund source (only in the classified annex).

(2) Estimates for NATO Infrastructure represent the Army Preferred Case.^{9/} Estimates for MCA are from Volume II of the January 1980 DA Program Budget Guidance (PBG).^{10/}

(3) Description of project grouping (i.e., what is to be constructed).

(4) Rationale or logic to use in negotiations.

(5) Army reasoning within each fund source.

20. Uses of the Matrix.

a. The matrix provides an overall view or perspective of Army-initiated construction for Europe showing interrelationships between and among project groupings.

b. The matrix is a tool that can help Army programmers develop a balanced program both in terms of project composition and among the potential funding sources.

^{9/} DA, Ofc of the Asst Chief of Engrs, Prog Div, Memo, NATO Infrastructure; Army Preferred Case.

^{10/} DA, HQ, Department of the Army Program Budget Guidance.

c. The matrix provides a basis for developing negotiating strategies or positions. This information can be used for finalizing the US position in support of new categories proposed for Infrastructure funding, expanding of existing eligibility criteria, and/or ensuring that the US does not overload requests for funding support from HNs.

d. The matrix is a mechanism to surface points of conflict or congruence between the Army, DOD, Department of State, and Congress.

e. As an example of matrix usage, consider the following application. After looking at the points surfaced in the matrix, it may be to the US's overall advantage to propose that the Infrastructure program fund additional days of storage in the TR-1 category. On a purely economic analysis basis, the US would not be able to support an expansion of this category within Infrastructure because the US cost share for all Infrastructure projects in this category would be larger than the US costs to finance additional TR-1 storage unilaterally. The US may be willing to trade off economic benefit on a specific cost item (TR-1) in order to achieve a broader goal--specifically, that the Alliance as a whole would be able to sustain combat for some number of additional days. This is due to the fact that the other allied nations would increase their reserve storage based on their ability to use shared costs for storage facility construction through the Infrastructure program (where it was to their economic advantage to do so). Thus, the US may accept a small economic loss in a particular category, but also would be able to achieve larger policy goals. Observations such as this would not normally emerge when traditional project by project or groupings of similar projects were analyzed.

f. Reviewing the data in the matrix and seeing how much the US is providing for construction in Europe generates a question as to the adequacy of the contributions by the European Allies. In early February at a NATO conference in Munich, Ambassador Robert W. Komer, Under Secretary of Defense for Policy, stated:^{11/}

For a long time Europe has not borne the proportion of the common defense burden which would seem warranted by its political stake and economic growth. Japan has done even less.

This was understandable when Europe and Japan were recovering from the ravages of World War II. Does it any longer adequately reflect the balance of mutual interests or that of our comparative strength? Indeed, we Americans are increasingly asking whether Europe is as interested in its own defense as is the United States.

This issue regarding adequacy of contributions by member nations within alliances is treated in the next section.

^{11/} Burt, "Pentagon Aide Says Allies Let U.S. Carry Burden," New York Times.

IV. COST SHARING IN ALLIANCES

21. Current Defense Cost Sharing in NATO. The US contributes more to NATO defense than any other nation. Figure 7 shows the total defense expenditure by country and this national defense expenditure as a percentage of the NATO total. This figure clearly shows that the US is by far the largest contributor of all the NATO nations. In fact, US defense expenditures are larger than the combined expenditures of all the other Allies. The US has continued to maintain a large military presence in Europe despite unfavorable balances of trade.^{12/} Congress has continually requested the US military to reduce its share of the NATO Infrastructure program (currently about 27 percent) despite attempts by defense planners who have argued that the US is receiving more in benefits from the program than it is paying in costs.

22. Defense as a Public Good.

a. In order to analyze cost sharing within an alliance, it is necessary to review some economic theories and past research in alliances. Gavin Kennedy's book^{13/} provides a detailed treatment of these theories.

b. Defense qualifies as a public good because it satisfies the two main ingredients of a public good, nonexclusivity and nonrivalry. Defense is nonexclusive because all citizens of a country are defended equally, and it is nonrival because the use of defense by one citizen does not reduce the amount available to other citizens.

c. NATO defense expenditures provide an example of a public good because of the existence of a joint multinational military command and because of a founding premise of NATO. NATO's Charter, Article 5, states that "an

^{12/} Treverton, The "Dollar Drain" and American Forces in Germany.

^{13/} Kennedy, Burden Sharing in NATO.

armed attack against one or more of them in Europe or North America shall be considered an attack against them all....^{14/}

DEFENSE EXPENDITURES OF NATO NATIONS IN 1977

Member Nation	National Defense Expenditures (\$ Million)	National Defense Expenditures As % of NATO
Belgium	2,285	1.52
Canada	4,134	2.76
Denmark	1,011	.67
Germany	16,306	10.88
Greece	1,138	.76
Italy	4,849	3.24
Luxembourg	26	.02
Netherlands	3,453	2.30
Norway	1,062	.71
Portugal	614	.41
Turkey	2,676	1.79
United Kingdom	11,378	7.59
United States	100,928	67.35
NATO Total ^{a/}	149,860	100.00

^{a/} Iceland has no defense expenditures; France withdrew for military purposes in 1966.

Figure 7

23. Public Goods in the Small Group.

a. NATO is treated as a small group because of its size (13-15 sovereign member nations). An assumption in small group theory is that there is minimal "free riding." Free riding refers to the concept where an individual (or a member nation) does not pay his or her "fair share" for benefits received because of the inability of the group to properly assess charges for benefits. Another assumption of the small group with similar sized members is that each individual nation makes a noticeable impact on the total amount of

^{14/} NATO, NATO Info Svc, NATO Handbook. (pp. 14-15.)

public good (defense) provided, thus making free riding harder. Nevertheless, some free riding is inevitable when members are not similarly sized. (The NATO nations are not similarly sized.)

b. A small group can negotiate defense or public good improvements. However, quoting from Kennedy, "...where valuations are unequal there will be unequal shares of provision costs; in particular, that the larger members will contribute disproportionately to the common costs (Olson & Zeckhauser 1968) or, putting it another way, the smaller members will exploit the larger members (Olson 1965; De Strihou 1968)."^{15/}

c. Free riding considerations excluded, the small group, through political bargaining processes, is able to negotiate the individual cost shares and total contributions which constitute the collective defense by the group. These negotiations may be difficult, time-consuming, and politically divisive. Negotiations of equitable or fair cost shares are functions of subjective political judgments such as:

- (1) Different strategic objectives.
- (2) Different perceptions of costs and gains.
- (3) Different views concerning risk and threat factors.
- (4) Relative capabilities.
- (5) Time.

24. Basis of Equitable Taxation. An equitable tax structure would have each member of the community pay a "fair share" for the cost of the public good. Unfortunately, such an ideal formula has never been developed or agreed on by member nations or by members of society. However, theories of taxation fall into two major groups--benefit and ability to pay.

^{15/} Kennedy, Burden Sharing in NATO. (p. 29.)

a. Benefit. Under this criterion, individual (or member nation) taxes are assigned based on benefits received. The simplest example of a benefit tax is the fee on a toll road. Only those individuals using the toll road pay for the initial construction cost and maintenance costs of the facility. Direct benefits are often very hard to define.

b. Ability to pay. According to this principle, individuals or nations are assessed or taxed based on incomes--those with higher incomes are expected to pay more for public goods than those with smaller incomes. This is the most common method of taxing.

25. Basic Forms of Taxation. There are three basic forms of taxation with respect to income levels: regressive, proportional, and progressive. The marginal tax rate is the change in amount of tax paid with respect to change in income for an individual or nation. The effective tax rate is the amount of tax paid divided by income for an individual or a nation.

a. Regressive. A regressive tax is a tax that takes a greater percentage of the wealth from low income people or nations. In a regressive tax the marginal tax rate is less than the effective rate. The toll road example discussed in the benefit concept is an example of a regressive tax. Because everyone using the road is charged the same amount of money, poor users are paying a larger percentage of their incomes than are wealthier users. Another example of a regressive tax is a head tax (or for nations, a tax based on population).

b. Proportional. A proportional tax is a tax based on a constant rate of taxation over all income levels. In a proportional tax, the marginal tax rate is equal to the effective tax rate. While individuals or nations are taxed at the same rate, they will pay different actual amounts based on the size of their incomes.

c. **Progressive.** A progressive tax is a tax that levies higher rates of taxation to higher income levels. In a progressive tax, the marginal tax rate is greater than the effective tax rate. The US income tax is an example of the application of a progressive tax structure.

26. Equity Considerations and NATO Cost Sharing. In the preceding paragraphs, defense provided by NATO has been defined as a public good, NATO was assumed to be a small group, and various methods of taxation were defined. How would NATO defense costs be distributed if the concepts discussed in the preceding paragraphs were applied? Annex A describes in detail the procedures used to produce the normative cost shares that are presented in Figure 8 and discussed below.

a. Figure 8 shows the normative cost shares for NATO defense based on regressive, proportional, and progressive methods of taxation. It also shows the current percentages of NATO defense paid by each member nation. The last column shows the current cost shares being paid by the nations in the Infrastructure program--a subset of total NATO defense costs.

b. An analysis of Figure 8 with respect to the US shows that, for total defense spending, the US is currently paying more for defense (column 1) than would be computed in any of the tax methods (columns 2-4). If NATO decided to have the same total defense expenditures that it now has and would reallocate them to member nations based on an acceptable tax formula, the US would, in all probability, see a reduction.

c. Greece, Italy, Portugal, Turkey, and the United Kingdom (UK) (the least affluent nations in NATO) would be assessed more based on the regressive structure, about the same based on the proportional method, and significantly less on a progressive scale when compared with shares in column 1.

COMPARISON BETWEEN CURRENT AND NORMATIVE ALLIANCE COST SHARES
(Percentages)

Member Nation	(1)	(2)	(3)	(4)	(5)
	Current (1977)				Current
	Cost Share Expenditure	Regressive	Proportional	Progressive	Cost Share NATO Infrastructure
Belgium	1.52	1.93	2.17	2.12	5.59
Canada	2.76	4.59	6.22	6.91	6.36
Denmark	.67	1.00	1.21	1.25	3.73
Germany	10.88	12.08	14.58	14.99	26.54
Greece	.76	1.83	.75	.40	.79
Italy	3.24	11.10	5.51	3.30	7.99
Luxembourg	.02	.08	.07	.06	.21
Netherlands	2.30	2.73	2.92	2.77	5.14
Norway	.71	.79	1.02	1.10	3.14
Portugal	.41	1.91	.56	.23	.20
Turkey	1.79	8.23	1.42	.23	.81
United Kingdom	7.59	11.02	7.08	4.93	12.08
United States	67.35	42.71	56.49	61.71	27.42
NATO Total	100.00	100.00	100.00	100.00	100.00

Figure 8

d. Norway, Denmark, and the BENELUX countries (Belgium, Netherlands, Luxembourg) would be assessed slightly more than they are currently paying no matter which tax structure was employed to distribute NATO defense costs. However, each of these increases would represent less than 1 percent of the NATO total.

e. Canada and Germany would be required to pay much larger percentages of the NATO defense costs than they are currently paying (column 1) no matter which method would be used to assess tax rates.

f. The current Infrastructure program cost shares were shown (in column 5 of Figure 8) to point out an interesting phenomenon. The US cost share in Infrastructure is well below what could be expected if any of the tax structures for sharing defense expenditures were applied. This point will be examined in more detail.

27. Financing of the NATO Infrastructure Program.

a. The Infrastructure program claims to have a formula for distributing costs among the participants. While three criteria are stated, there is no evidence that they are now or ever were directly applied in assigning cost shares to the member nations. The three major components of this formula are:

(1) Ability to pay. This is usually stated in terms of a nation's Gross National Product (GNP) or Gross Domestic Product (GDP). For most of the NATO nations, there is an insignificant difference between these two income measures.

(2) Benefit to HN. These are advantages accruing as a result of having construction projects on HN soil. Such advantages are primarily domestic economic benefits resulting from the construction project itself and longer term spending by troops from the using nations.

(3) Benefit to user nation. If a construction project is sponsored by Infrastructure, the user nations pay only a fraction of the total construction costs.

b. Figure 9 shows the historical evolution of cost shares for member nations in the Infrastructure program. Note that the first set of cost shares was absorbed by the five members of the Western Defense Union. This was a classic case of bargaining or negotiating for public good provisions within a small group. As more members joined the program, the distribution of cost shares became more difficult. The most frequently quoted description of how the Infrastructure cost shares were devised or assessed is from Lord Ismay, the first Secretary General of NATO, who was given the task of apportioning them. He said:^{16/}

They dumped the whole problem in my lap, so I called in three assistant secretaries general, and each of us drew up our own list of what we thought the percentage of sharing should be, and then we averaged them out. I couldn't for the life of me possibly say on what basis I acted except I tried to take into account all sorts of things like the ability to pay and whether the building (of installations) would be going on in a country so that it would benefit from the construction and the money spent.

Then we got into the Council meeting in April of 1953, and everybody around the table thought it was a jolly good distribution except for his own, which they thought was too high. Anyway, we went round the table and finally got agreement of each to take what was given within 1.8 percent of the total, and then we simply divided up that 1.8 percent among the fourteen, and that's all there was to it. That's why all the shares are in those funny percentage amounts.

At this time (circa 1953) the US share was 43.67 percent, while the US proportion of NATO's GNP was over 68 percent.

^{16/} Brookings Inst, Financing the United Nations System. (p. 55.)

NATO INFRASTRUCTURE COST SHARING FORMULAS
(By Slice Group and Year)

Member Nation	I 1950	II-VII (1951-56)	VIII-XI (1957-60)	XII-XV (1961-64)	XVI-XX (1965-69)	XXI-XXV (1970-74)	XXVI-XXX (1975-79)	XXXI-XXXV (1980-84)
Belgium	13.18	5.46	4.39	4.24	5.30	5.30	5.55	5.59
Canada	--	6.02	6.15	5.15	6.31	6.31	6.31	6.36
Denmark	--	2.77	2.63	2.87	3.54	3.54	3.70	3.73
France	45.46	15.04	11.87	12.00	--	--	--	--
Germany	--	--	13.72	20.00	25.18	25.18	26.36	26.54
Greece	--	.75	.87	.67	.76	.76	.79	.79
Italy	--	5.68	5.61	5.97	7.58	7.58	7.93	7.99
Luxembourg	.45	.16	.17	.17	20	.20	.21	.21
Netherlands	13.64	3.89	3.51	3.83	4.87	4.87	5.10	5.14
Norway	--	2.28	2.19	2.37	2.98	2.98	3.12	3.14
Portugal	--	.15	.28	.28	.35	.35	.37	.20
Turkey	--	1.37	1.75	1.10	1.26	1.26	1.33	.81
United Kingdom	27.27	12.76	9.88	10.50	12.00	12.00	12.00	12.08
United States	--	43.67	36.98	30.85	29.67	29.67	27.23	27.42
NATO Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

SOURCE: NATO, NATO Info Svc, NATO: Facts and Figures.

Figure 9

c. As can be seen on Figure 9, the US share has decreased from 43.67 percent to the current assessment of 27.42 percent. During this period, Germany has taken up most of the slack resulting from decreases in US assessment and the withdrawal of France in 1966. (France still participates in some Infrastructure projects, and for each slice group shown on Figure 9 after slice 20, there is an alternate set of cost shares. The current French share and reductions for the other nations are shown in column 3 of Figure 10.)

CHANGE IN INFRASTRUCTURE COST SHARE PERCENTAGES

Member Nation	(1975-79) Minus (1970-74)	(1980-84) Minus (1975-79)	Slice Group 31-35 With French Participation
Belgium	+0.25	+0.04	-0.97
Canada	--	+0.04	-0.85
Denmark	+0.17	+0.03	-0.65
Germany	+0.18	+0.19	-4.59
Greece	+0.03	--	-0.13
Italy	+0.35	+0.06	-1.38
Luxembourg	+0.01	+	-0.04
Netherlands	+0.23	+0.04	-0.89
Norway	+0.14	+0.02	-0.54
Portugal	+0.02	-0.17	--
Turkey	+0.06	-0.52	--
United Kingdom	--	+0.08	-1.62
United States	-2.44	+0.19	-1.55
France	--	--	+13.21

NOTE: Slice group 31-35 covers calendar years 1980-1984.

Figure 10

d. Negotiated cost share differences have been very small in the last three slice groups. Figure 10 shows the change in cost share percentages agreed to by the member nations. Note that the US was the only nation to negotiate a reduction in cost shares between the 1970-74 and 1975-79 slice

groups. The US cost decrease was absorbed by all of the other nations except for Canada and the UK. The nations in Europe appear to have absorbed the increase on a strictly proportional basis--each nation agreed to about a 4.6 percent increase over the rate they were paying in the previous slice group. It does not appear that the ability to pay, benefit to host, or benefit to user nation factors directly entered into those negotiations. For the change in cost shares of the current assessments, only very slight adjustments were made to account for domestic economic problems within Turkey and Portugal. Once again, all nations absorbed the reduction in cost shares granted to Portugal and Turkey on a strictly proportional basis--each nation absorbing about a 0.7 percent increase. For example, the US share of Infrastructure in slice group 26-30 was 27.23 percent. A 0.7 percent increase equals $0.2723 \times 1.007 = 0.2742$, the share percentage of the US in slice group 31-35. For Belgium the same calculations would yield $0.0552 \times 1.007 = 0.0559$ or 5.59 percent, the current Belgium share percentage.

e. Except for Turkey and Portugal, the US was the only nation to successfully negotiate reduced cost shares as shown in Columns 1 and 2 of Figure 10. In addition to the official cost share reductions, the other NATO members devised some special concessions for the US. These concessions were the European Defense Improvement Program (EDIP), the United States Special Program (USSP), and the most recently negotiated item, the Reinforcement Support Category (RSC). Each of these concessions reduces the actual amount paid by the US to the Infrastructure program.

(1) EDIP. In slice group 21-25, the Euro-Group (NATO members less US, Iceland, France, Canada, UK, and Portugal) contributed approximately \$520 million for Infrastructure projects (primarily aircraft shelters) for

which the US did not have to contribute. By including this figure in the total of Infrastructure projects and recomputing the US cost share on only those projects for which the US had to contribute, the effective US share computed out to be approximately 21.67 percent.

(2) USSP. In slice group 26 to 30, the US was granted approximately \$100 million worth of projects which were not normally eligible for Infrastructure funding. The inclusion of these projects also reduced the official US share percentage to an effective share of about 22 percent, even though the US was required to pay 28.55 percent for each of these USSP projects. (The normal US share was 27.23 percent.)

(3) RSC. For slice group 31-35, the nations have created a new category of projects that Infrastructure will fund. This RSC grouping of projects will mean that several US initiatives not normally eligible under the Infrastructure program will be jointly financed.

28. US Role in Infrastructure.

a. Within the Infrastructure program, the US has been successful in reducing its share percentage over the years. For political reasons, the US must remain the largest contributor in the Infrastructure program because many European nations do not want Germany to be in that position. As the largest member, the US has certain obligations and benefits. The US provision of both conventional and nuclear forces on the European continent has the effect that some Allies will do less than they otherwise would do on defense matters (the free-riding concept). Most European Allies have agreed to increase defense spending by 3 percent per year over the coming 5 years. Infrastructure, however, is only a subset of total defense spending designed to protect NATO. What probably has happened in the Infrastructure program is that the NATO Allies have made concessions to the US (on a small part of total defense

expenditures) in exchange for the knowledge that the total US defense expenditures will more than compensate. This concept was clearly expressed by Vayrynen, who said:^{17/}

In analyzing United States demands for more equal burden-sharing one must recall, however, that in NATO larger countries provide a smaller share of the Infrastructure costs than of other alliance costs. There is a significant negative correlation between GNP and the percentage of GNP devoted to NATO Infrastructure. This state of affairs can be interpreted as an effort at institutional arrangements to offset the problems created by disproportionate over-all burden sharing.

b. Cost sharing theories cannot fully explain the percentages paid by member nations in the Infrastructure program. Negotiations over the past several slice groups seem to have been aimed primarily at making minor adjustments to reflect drastic changes in a member nation's ability to pay (i.e., Turkey and Portugal). These negotiations also seem to be flexible enough to build in concessions so that while the US is the largest official contributor on paper, its effective share percentage or contribution is somewhat less.

c. This section examined Infrastructure from the US defense viewpoint. There was no attempt to analyze the multination, jointly financed construction program by a single using service component (i.e., the US Army). Any analysis of single service components must be addressed in the context of the overall US construction program for Europe. Historically, the Army has not received as much money from the Infrastructure program as the US Air Force. However, the new emphasis on reinforcement by NATO indicates that the Army will be receiving Infrastructure funds for more projects in the next 5 years.

^{17/} Vayrynen, "The Theory of Collective Goods, Military Alliances and International Security," International Social Science Journal. (p. 303.)

V. CONCLUSION

29. Summary.

a. This report presented several perspectives on the programming and financing of US Army construction projects in Europe. Treated in major sections were the generation of requirements for construction projects and how the Army determines the funding source to pursue, the results of these decisions displayed in matrix format showing details by major project categories, and an analysis and explanation of cost sharing between Alliance members in general and for the Infrastructure program in more detail.

b. Major points treated and worthy of repeating are:

(1) The Army has a reasonable method for making funding decisions with respect to projects in the European theater.

(2) The summary display of these decisions in the logic matrix is a useful tool for Army planners both at the DA and USAREUR levels.

(3) The US cost share of financing defense costs for NATO is difficult to measure and hard to explain using economic and group theory. However, when the Infrastructure program is examined, it appears that the US is not paying an excessive share for its participation. Unlike the burden it carries for NATO as a whole, the US is probably getting a "good deal" in the Infrastructure program.

LAST PAGE MAIN PAPER

ANNEX A

CALCULATION OF NORMATIVE COST SHARES

ANNEX A

CALCULATION OF NORMATIVE COST SHARES

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A-4	US Federal Income Tax Rates for 1979	A-6

1. Purpose. This annex provides a detailed description of the methods used to develop normative cost shares for regressive, proportional, and progressive forms of assessment for NATO member nations as shown in Figure 8 of the Main Report.

2. Regressive Cost Shares. If the NATO defense costs were apportioned to members under a regressive income scheme, the payment would most likely be in the form of a head tax. Figure A-1 shows the population of each NATO nation and also expresses this figure as a percent of the Alliance total. If cost shares were based on a head tax using population as the basis, it would be a regressive tax. If cost shares were proportional to population, the defense share for each nation would be those shown under the "Percent of NATO" column. Under the regressive method, the US would contribute 42.71 percent.

**ESTIMATE OF REGRESSIVE COST SHARES
(1977 Data)**

<u>Nation</u>	<u>Population (Millions)</u>	<u>Percent of NATO</u>
Belgium	9.8	1.93
Canada	23.3	4.59
Denmark	5.1	1.00
Germany	61.4	12.08
Greece	9.3	1.83
Italy	56.4	11.10
Luxembourg	.4	.08
Netherlands	13.9	2.73
Norway	4.0	.79
Portugal	9.7	1.91
Turkey	41.8	8.23
United Kingdom	56.0	11.02
United States	<u>217.0</u>	<u>42.71</u>
NATO Total	508.1	100.00

SOURCE: US Arms Control and Disarma-
ment Agency, World Military Expendi-
tures and Arms Transfers 1968-1977.

Figure A-1

3. Proportional Cost Shares. If NATO defense costs were to be appor-
tioned based on a proportional method of taxation, cost shares would most
likely be based on the relative incomes of the nations in the Alliance. The
GDP or GNP would be the basis for the assessment. Figure A-2 shows the GNP
for each NATO member and also expresses this figure as a percent of the
Alliance total. The defense share for each nation would be those shown under
the "Percent of NATO" column if cost shares were proportional to national
income. Under the proportional method, the US would contribute 56.49 percent.

ESTIMATE OF PROPORTIONAL COST SHARES
(1977 Data, Millions of Current Dollars)

Nation	GNP	Percent of NATO
Belgium	71,922	2.17
Canada	206,250	6.22
Denmark	40,099	1.21
Germany	483,844	14.58
Greece	24,969	.75
Italy	182,927	5.51
Luxembourg	2,423	.07
Netherlands	96,788	2.92
Norway	33,825	1.02
Portugal	18,644	.56
Turkey	47,144	1.42
United Kingdom	234,891	7.08
United States	<u>1,874,402</u>	<u>56.49</u>
NATO Total	3,318,128	100.00

SOURCE: US Arms Control and Disarmament Agency, World Military Expenditures and Arms Transfers 1968-1977.

Figure A-2

4. Progressive Cost Shares. It is more difficult to estimate cost shares based on a progressive scheme than those used for either the regressive or proportional methods. Decisions must be made on both the representative income measure for the member nations and the rate of progression to be applied.

a. Choice of method. There have been a number of attempts to develop formulas or methods for the progressive distribution of cost shares among members of international organizations.^{1/} The method selected for the

^{1/} See Kennedy, Burden Sharing in NATO (pp. 60-62) and De Strihou, "Sharing the Defense Burden Among Western Allies," Yale Economic Essays (pp. 291-301).

purposes of this report was devised by Paul Rosenstein-Rodan who first applied it to the problem of distributing foreign aid from industrialized nations to underdeveloped nations.^{2/} He used the US Federal income tax structure which reflects at least American perceptions of an acceptable progressive taxation scheme. This method also is flexible enough to cover the wide range of national incomes and populations within NATO. Relative wealth and productive capacities of member nations are taken into account for measuring the ability to pay.

b. Application of method. Figure A-3 summarizes output from the key steps involved in deriving and calculating a progressive tax structure for apportioning NATO defense costs. After obtaining both GNP and population data for the NATO members, the GNP per capita is computed and is shown in column 3. The GNP per capita does not provide a sufficient range of incomes on which to assess tax rates. Therefore, the GNP per family (four people) was computed and is shown in column 4. The GNP per family for the NATO member nations produces a range of incomes that are amenable to application of existing tax scales or tables. The current US Federal income tax rate structure was applied assuming that the GNP per family of the member nations is similar to corresponding family incomes in the US. (Figure A-4 shows an extract from the current US Federal income tax structure, Schedule Y for married taxpayers, and a sample calculation of tax.) Column 5 shows the resulting tax per family income for the NATO nations. The total tax or contribution for a nation (column 7) is found by multiplying the number of families (column 6) times the tax per family (column 5). Note that these computed taxes themselves have no

^{2/} Rosenstein-Rodan, "International Aid for Underdeveloped Countries," Review of Economics and Statistics. (pp. 110-11 and 138.)

CALCULATION OF PROGRESSIVE COST SHARES

Nation	(1) GNP (Million Current Dollars)	(2) Popula- tion (Million)	(3) GNP per Capita (Current Dollars)	(4) GNP per Family (Current Dollars)	(5) Tax per Family (Current Dollars)	(6) No. of Families (Million)	(7) Tax Revenue (Million)	(8) Progressive Cost Shares (%)
Belgium	71,922	9.8	7,339	29,356	6,027	2.45	14,766	2.12
Canada	206,250	23.3	8,852	35,408	8,251	5.83	48,103	6.91
Denmark	40,099	5.1	7,863	31,452	6,775	1.28	8,672	1.25
Germany	483,844	61.4	7,880	31,520	6,800	15.35	104,380	14.99
Greece	24,969	9.3	2,685	10,740	1,195	2.33	2,784	.40
Italy	182,927	56.4	3,243	12,972	1,629	14.10	22,969	3.30
Luxembourg	2,423	.4	6,058	24,232	4,402	.10	440	.06
Netherlands	96,788	13.9	6,963	27,852	5,546	3.48	19,300	2.77
Norway	33,825	4.0	8,456	33,824	7,653	1.0	7,653	1.10
Portugal	18,644	9.7	1,922	7,688	646	2.43	1,570	.23
Turkey	47,144	41.8	1,128	4,512	156	10.45	1,630	.23
United Kingdom	234,891	56.0	4,194	16,776	2,451	14.00	34,314	4.93
United States	1,874,402	217.0	8,638	34,552	7,922	54.25	429,769	61.71
NATO Total	3,318,128	508.1					696,350	100.00

Figure A-3

direct relation to actual defense costs in NATO. The final step in the progressive tax method consists of translating computed total taxes into percentages of the NATO total. Column 8 shows the results of these computations and these represent the normative cost shares for NATO defense to be paid by the member countries. Thus, if cost shares were distributed by this progressive tax scheme, the NATO defense share for each member nation would be those displayed under the "Progressive Cost Shares" (percent) column. Under the progressive method the US would contribute 61.71 percent.

US FEDERAL INCOME TAX RATES FOR 1979
(Schedule Y, Married Taxpayers)

Income Range	Tax Rate
\$ 0 - 3,399	\$ 0 + 0
\$ 3,400 - 5,499	\$ 0 + 14% over 3,400
\$ 5,500 - 7,599	\$ 294 + 16% over 5,500
\$ 7,600 - 11,899	\$ 630 + 18% over 7,600
\$11,900 - 15,999	\$ 1,404 + 21% over 11,900
\$16,000 - 20,199	\$ 2,265 + 24% over 16,000
\$20,200 - 24,599	\$ 3,273 + 28% over 20,200
\$24,600 - 29,899	\$ 4,505 + 32% over 24,600
\$29,900 - 35,199	\$ 6,201 + 37% over 29,900
\$35,200 - 45,799	\$ 8,162 + 43% over 35,200
\$45,800 - 59,999	\$12,720 + 49% over 45,800
\$60,000 - 85,599	\$19,678 + 54% over 60,000

Sample Calculation of Tax:

US GNP/Family	=	\$34,552 ^{a/}
Tax for US	=	\$ 6,201 + 0.37 (\$4,652)
	=	\$ 6,201 + 1,721
	=	\$ 7,922 ^{b/}

^{a/} Column 4, Figure A-3.

^{b/} Column 5, Figure A-3.

Figure A-4

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ANNEX B

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